

Notice of Allowability

Application No.

10/786,142

Examiner

Tho v Duong

Applicant(s)

CARTER ET AL.

Art Unit

3743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 2/26/04 and 8/3/04.
2. ☒ The allowed claim(s) is/are 1-23.
3. ☒ The drawings filed on 26 February 2004 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 2/26/2004
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Tho v Duong
Examiner
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EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Stephen P. Catlin on 8/3/2004.

The application has been amended as follows:

In claim 20, at line 2, after "an array of", --at least two-- has been inserted.

In claim 20, at line 4, after "the array of", -- at least two -- has been inserted.

In claim 20, at line 13, 'a conduit of a predetermined size housing the coil assembly and including a gas inlet and outlet' has been deleted.

In claim 20, at line 15, after "the array of", --at least two-- has been inserted.

In claim 23, at line 3, ' an inlet manifold connected to the inlets of each of the at least two serpentine circuits' has been deleted.

In claim 23, at line 5, ' an outlet manifold connected to the outlets of each of the at least two serpentine tubes;' has been deleted.

In the abstract, from lines 1-6, 'A heat exchanger coil assembly design...for a given heat exchanger size' has been deleted.

In the abstract, from lines 13-the end of the abstract, 'The depression areas provide only...with various types of heat exchangers' has been deleted.

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In the abstract, at line 6, (begin of the new abstract), before "coil assembly", 'The' has been deleted and --A heat exchanger--has been inserted.

Allowable Subject Matter

Claims 1-23 are allowed.

The following is an examiner's statement of reasons for allowance: the prior art either taken singularly or in combination fails to disclose a coil assembly for a heat exchanger comprising a depression area coinciding with each point of overlap of the return bends of adjacent serpentine circuits being provided on a surface of at least one of the overlapping return bends; and wherein the serpentine circuits are densely packed with adjacent ones of the serpentine circuits nesting in the depression area and defining a spacing (S) between each adjacent circuit that is less than the diameter (D) of the tubes. The spacing (S) is defined from the disclosure as the distance between two centerlines of the tubes and the diameter (D) is defined as the outer diameter of the tube. Reference to Merrill (US 4,755,331) is the closest prior art but fails to disclose the depression area and the claimed relationship between (S) and (D).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Merrill et al. (US 4,755,331) discloses an evaporative heat exchanger that has an elliptical tube coil assembly with two bend return sections placed adjacent to each other.

Schinner (US 4,196,157) discloses an evaporative counterflow heat exchanger that has two bend return sections in circular shape being in contact.

Aaron (US 6,216,486) discloses a coil assembly that has overlapping fins.

Beagle et al. (US 5,535,320) discloses a heat exchanger that has serpentine circuits having a flat portion at the bend section of the tube for inserting the tube into a fin.

F. A. Maher (US 3,357,484) discloses a tube separator assembly for annular fluid tube coils.

Cates (US 4,683,101) discloses a heat exchanger assembly comprising a direct/indirect heat exchanger.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tho Duong whose telephone number is (703) 305-0768. The examiner can normally be reached on from 9:30-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennet, can be reached on (703) 308-0101. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.

TD

August 3, 2004

Tho Duong

Patent Examiner.